

REMARKS

Paragraph numbers utilized herein correspond to like paragraph numbers in the Office Action mail dated July 21, 1999 (Paper No. 3).

Importance of applicants' invention

Prior to addressing the various rejections, applicant wishes to point out the importance of applicant's invention in the evolution of the prior art. In essence, the art has evolved as follows: (1) early art taught sequential injection of solutions of the polymer components; (2) with an improvement being formation of a single aqueous gelation solution at the surface; and (3) with a further improvement being formation of a gelation solution to which the fibers are then added. As an even further evolution, the claimed invention is directed to a dry mix of the polymer components and fibers.

The use of gels in the production of hydrocarbons is a very tricky process for which there has been much development in the prior art.

Early prior art taught that "a polymer such as polyacrylamide is injected into a formation followed sequentially by a crosslinking agent [as it] is generally held that effective polymer/crosslinking agent systems necessitate sequential injection of the gel components followed by in situ mixing because gel systems mixed on the surface are difficult to regulate." See, U.S. Patent No. 4,723,605 (Sydansk), col. 1, at 35-44 (emphasis added).

The improvement of U.S. Patent No. 4,723,605 (Sydansk) was to provide “a single aqueous gelation solution at the surface”, which is formed by “first combining the complex and simple mineral acid . . . to form the crosslinking solution [which is then] mixed with the an aqueous polymer solution to produce the gelation solution. See, col. 6, at 5-10.

As a further evolution, U.S. Patent No. 5,377,760 (Merrill, cited in the Office action), discloses the use of fibers with a gel comprising a crosslinkable polymer and a crosslinking agent. Specifically, ‘760 teaches the formation of a gelation solution to which the fibers are then added:

See, abstract, “fibers are added to a gelation solution;”

See, col. 2, at 42-43, “introducing reinforcing fibers into the gelation solution;”

See, col. 2, at 52-53, “quantity of fibers introduced to the gelation solution;”

See, col. 3, at 10-12, “the invention contemplates the incorporation of fibers in a gel by mixing the fibers with the gelation solution at the surface;”

See, col. 7, at 7-9, “results further confirm the increased strength produced by adding reinforcing fibers to the gelation solution prior to injection;”

See, col. 7, at 15-18, “mixing the fibers with the gelation solution and injection the resulting mixture;”

See, col. 7, lines 4-48, “fibers are simple to introduce into the gelation solution;” and

See, claim 1, which requires first "providing a gelation solution" and then "introducing reinforcing fibers . . . into the gelation solution."

As an important improvement, applicant now teaches the addition of fibers to the dry components of the gelation solution, prior to formation of the solution (i.e., a dry mixture of the components and fibers). This improvement allows for ease of handing of the materials and of operation of the well.

Rejections under 35 USC § 112

2. Claims 3 and 6 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejection is respectfully traversed.

Specifically, it is alleged in the Office action that claims 3 and 6 contain improper Markusch language. As kindly suggested by the Examiner, applicant has amended the Markusch language of claim 6 by deleting the term "essentially".

It is respectfully noted by applicant that claim 3 does not contain Markusch language and is believed to be in proper form.

Since it also appears that claim 4 contains Markusch language in improper form (although not cited in the Office action), applicant has voluntarily amended claim 4 by deleting the term "essentially".

Claim Rejection - 35 USC § 102

4. Claims 1, 2 and 7 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,989,673 to Sydansk (herein referred to as Sydansk '673). The rejection is respectfully traversed.

The Office action cites Sydansk '673 as teaching a lost circulation fluid comprising a water soluble polymer and a cross linking agent, wherein the water soluble polymer is a carboxylate containing polymer having one or more carboxylate groups, and further cites Sydansk '673 as teaching the additional use of inert solids, such as sand fiberglass, cellulosic fibers, and plastic fibers to enhance the strength of the gel formed from the polymers and cross linking agents.

In response, applicant's independent claim 1 distinguishes Sydansk '673 by at least the required "dry mixture of a water soluble cross-linkable polymer, a cross linking agent, and a reinforcing material selected from fibers and comminuted plant material" (emphasis added). In contrast, Sydansk '673 teaches wet mixing of an "aqueous polymer solution" with either (1) "crosslinking agent solution" or (2) "starting materials for the crosslinking agent [which] can be dissolved directly into the aqueous polymer solution" (Sydansk '673 at col. 5, at lines 10-15, emphasis added). Thus, in either event, an aqueous polymer solution (i.e., it is not dry) is utilized to make the gel.

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1st Claim Rejection Under 35 USC § 103

6. Claims 1-4, and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,277,760 to Merrill (herein referred to as Merrill '760). The rejection is respectfully traversed.

The Office action cites Merrill '760 as teaching gels capable of blocking or plugging relatively large openings in permeable formations, with the cited gels comprising a partially hydrolyzed carboxylate-containing polymer and a chromic carboxylate complex as a cross linking agent, and further cites the use of reinforcing materials which are incorporated into the gels.

In response, applicant respectfully notes that Merrill '760 expressly teaches first making of the gel solution followed by addition of the fibers thereto (i.e., the fibers are added to a wet polymer). Specifically, attention is directed to :

the Abstract, "fibers are added to a gelation solution;"

col. 2, lines 42-43, "introducing reinforcing fibers into the gelation solution;"

col. 3, lines 10-12, "incorporation of fibers in a gel by mixing the fibers with the gelation solution;"

col. 5, lines 16-17, "various amounts of the cellulosic and glass fibers were added to the gel;"

col. 5, line 56, "amounts of fiber added to the gel;"

col. 7, lines 7-9, "results further confirm the increased strength produced by adding reinforcing fibers to the gelation solution prior to injection;" and

col. 7, lines 47-48, "fibers are simple to introduce into the gelation solution."

In contrast, applicant's independent claim 1 requires "a lost circulation additive comprising a dry mixture of a water soluble cross-linkable polymer, a cross linking agent, and a reinforcing material selected from fibers and comminuted plant material". Thus, independent claim 1 and claims 2-4 and 7 by dependency, distinguish Merrill '760 by at least requiring "a lost circulation additive comprising a dry mixture".

*argument
maintain*

2nd Claim Rejection Under 35 USC § 103

7. Claims 1, 2, and 5-13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,004,553 to House et al in view of U.S. Patent 3,208,524 to Horner et al. The rejection is respectfully traversed.

The Office action cites House as teaching seepage loss fluids for well working applications, wherein said fluids comprise a combination of reinforcing materials in combination with a crosslinkable polymer, and further cites the preparation of the fluids by adding the seepage loss additives to water based well working fluids.

The Office action cites Horner as teaching loss circulation fluids comprising crosslinkable polymers, and further cites the employment of bulking agents into the polymer gels to reduce the amount of gel required and to permit the plugging of large fissures which might otherwise be difficult to plug.

In response, applicants independent claim 1 distinguishes both House and Horner at least by the required " lost circulation additive comprising a dry mixture of a water soluble cross-linkable polymer, a cross linking agent, and a reinforcing material selected from fibers and

comminuted plant material". In contrast, House and Horner teach making a solution (i.e., not dry) to which either a reinforcing material/seepage loss additive (see House col. 5, lines 39-41, "compositions of our invention can be prepared by adding the seepage loss reducing agent to the water base or oil base well working fluid ") or a bulking agent (see Horner col. 5, lines 43-44, "the bulking agent may be incorporated into the polysaccharide solution") is added. Applicant's independent claim 1, and claims 2 and 5-13 by dependency, distinguish each of the cited references by the required "dry mixture". Therefor, the combination of House and Horner cannot be said to disclose or teach applicant's claimed invention. *Maintain*

In view of the above arguments, prompt allowance of all pending claims is respectfully requested.

If it would be of assistance in resolving any issues in this application, the Examiner is kindly invited to contact applicants' attorney Mark Gilbreth at 713/227-1200.

Respectfully submitted,


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